Scientific Inquiry

5-1 The student will demonstrate an understanding of scientific inquiry, including the foundations of technological design and the processes, skills, and mathematical thinking necessary to conduct a controlled scientific investigation.

5-1.5 Construct a line graph from recorded data with correct placement of independent (manipulated) and dependent (responding) variables.
Taxonomy Level: 6.3-C Create Procedural Knowledge

Previous/Future knowledge: In 4th grade, students recognized the correct placement of variables on a line graph (4-1.5) and constructed and interpreted diagrams, tables, and graphs made from recorded measurements and observations (4-1.6). In 7th grade (7-1.5), students will explain the relationships between independent and dependent variables in a controlled scientific investigation through the use of appropriate graphs, tables, and charts.

It is essential for students to know that line graphs are used to represent data that has been collected over a determined amount of time (for example, change in fish population in a week). Once the data has been collected and organized in an appropriate data table, a graph can be constructed. To construct a line graph, the following steps should be taken:

- Draw a horizontal line (x-axis) and a vertical line (y-axis) that meet at a right angle.
- Identify the independent (manipulated) variable and the dependent (responding) variable from the data.
  - The independent (manipulated) variable is written on the x-axis.
  - The dependent (responding) variable is written on the y-axis.
  - Include appropriate units of measurement for each variable.
- Look at the range of data (lowest and highest) to determine the *intervals* or *increments* (numbers on the axes) of the x-axis and the y-axis.
  - The increments do not need to be the same for both the x-axis and the y-axis, but should be consistent on either axis.
  - Label the point at the right angle as zero (0).
- Plot the data on the graph as matched pairs. For example, every independent (manipulated) variable number will have a corresponding dependent (responding) variable number.
- Connect the points on the line graph.
- Write an appropriate title for the graph that contains the names of both variables.

NOTE TO TEACHER: A mnemonic device that can be used to teach the appropriate locations of the variables on a graph is DRY MIX.

- DRY represents Dependent-Responding-Y-axis.
- MIX represents Manipulated-Independent-X-axis.

It is not essential for students to construct circle graphs.

Assessment Guidelines:
The objective of this indicator is to *construct* a line graph from recorded data with correct placement of independent (manipulated) and dependent (responding) variables; therefore, the primary focus of assessment should be to create a line graph with the proper placement of the variables and data from the investigation. However, appropriate assessments should also require students to *identify* the correct placement of variables on line graphs; *identify* the parts of a line graph; *recognize* appropriate increments for a line graph of recorded data; *recognize* appropriate title for recorded data; *match* appropriate title to a given line graph; *exemplify* appropriate line graphs from recorded data; or *compare* line graphs with recorded data.